



EEDC6 (5067)P3
IEC 62680-1-1:2015

DRAFT TANZANIA STANDARD

(Draft for comments only)

**Universal serial bus interfaces for data and power –
Part 1-1: Common components - USB Battery
Charging Specification, Revision**

TANZANIA BUREAU OF STANDARDS

National Foreword

1 Introduction

This draft Tanzania Standard is being prepared by the Communication Equipment Technical Committee, under the supervision of the Electrical Engineering Divisional Standards Committee (EEDC)

This draft Tanzania Standard is an adoption of the International Standard **IEC 62680-1-1:2015** *Universal serial bus interfaces for data and power – Part 1-1: Common components - USB Battery Charging Specification, Revision* which has been prepared by the International Electrotechnical Commission.

2 Preamble

This draft Tanzania Standard contains specifications that define limits as well as detection, control and reporting mechanisms to permit devices to draw current in excess of the USB 2.0 specification for charging and/or powering up from dedicated chargers, hosts, hubs and charging downstream ports. These mechanisms are backward compatible with USB 2.0 compliant hosts and peripherals.

3 Terminology and conventions

Some terminologies and certain conventions are not identical with those used in Tanzania Standards; attention is drawn especially to the following: -

- 1) The comma has been used as a decimal marker for metric dimensions. In Tanzania Standards, it is current practice to use “full point” on the baseline as the decimal marker.
- 2) Where the words “International Standard(s)” appear, referring to this standard they should read “Tanzania Standard(s)”.



IEC 62680-1-1

Edition 1.0

2015-09

INTERNATIONAL STANDARD

colour inside



**Universal serial bus interfaces for data and power –
Part 1-1: Common components – USB Battery Charging Specification,
Revision 1.2**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.220; 33.120; 35.200

ISBN 978-2-8322-2844-9

Warning! Make sure that you obtained this publication from an authorized distributor.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

UNIVERSAL SERIAL BUS INTERFACES FOR DATA AND POWER –

Part 1-1: Common components – USB Battery Charging Specification, Revision 1.2

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62680-1-1 has been prepared by technical area 14: Interfaces and methods of measurement for personal computing equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on documents prepared by the USB Implementers Forum (USB-IF). The structure and editorial rules used in this publication reflect the practice of the organization which submitted it.

This first edition cancels and replaces IEC 62680-3 published in 2013. This edition constitutes a technical revision.

The text of this standard is based on the following documents:

CDV	Report on voting
100/2330/CDV	100/2433/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

A list of all the parts in the IEC 62680 series, published under the general title *Universal serial bus interfaces for data and power* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The IEC 62680 series is based on a series of specifications that were originally developed by the USB Implementers Forum (USB-IF). These specifications were submitted to the IEC under the auspices of a special agreement between the IEC and the USB-IF.

The USB Implementers Forum, Inc.(USB-IF) is a non-profit corporation founded by the group of companies that developed the Universal Serial Bus specification. The USB-IF was formed to provide a support organization and forum for the advancement and adoption of Universal Serial Bus technology. The Forum facilitates the development of high-quality compatible USB peripherals (devices), and promotes the benefits of USB and the quality of products that have passed compliance testing.

ANY USB SPECIFICATIONS ARE PROVIDED TO YOU "AS IS," WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT, OR FITNESS FOR ANY PARTICULAR PURPOSE. THE USB IMPLEMENTERS FORUM AND THE AUTHORS OF ANY USB SPECIFICATIONS DISCLAIM ALL LIABILITY, INCLUDING LIABILITY FOR INFRINGEMENT OF ANY PROPRIETARY RIGHTS, RELATING TO USE OR IMPLEMENTATION OR INFORMATION IN THIS SPECIFICATION.

THE PROVISION OF ANY USB SPECIFICATIONS TO YOU DOES NOT PROVIDE YOU WITH ANY LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS.

Entering into USB Adopters Agreements may, however, allow a signing company to participate in a reciprocal, royalty-free licensing arrangement for compliant products. For more information, please see:

<http://www.usb.org/developers/docs/>

http://www.usb.org/developers/devclass_docs#approved

IEC DOES NOT TAKE ANY POSITION AS TO WHETHER IT IS ADVISABLE FOR YOU TO ENTER INTO ANY USB ADOPTERS AGREEMENTS OR TO PARTICIPATE IN THE USB IMPLEMENTERS FORUM.”

This series covers the Universal Serial Bus interfaces for data and power and consists of the following parts:

IEC 62680-1 -1, *Universal Serial Bus interfaces for data and power – Part 1-1: Common components – USB Battery Charging Specification, Revision 1.2*

IEC 62680 -2-1, *Universal Serial Bus interfaces for data and power – Part 2-1: Universal Serial Bus Specification, Revision 2.0*

IEC 62680-2 -2, *Universal Serial Bus interfaces for data and power – Part 2-2: USB Micro-USB Cables and Connectors Specification, Revision 1.01*

IEC 62680 -2-3, *Universal Serial Bus interfaces for data and power – Part 2-3: Universal Serial Bus Cables and Connectors Class Document Revision 2.0*

This part of the IEC 62680 series consists of several distinct parts:

- the main body of the text, which consists of the original specification and all ECN and Errata developed by the USB-IF.

CONTENTS

FOREWORD	2
INTRODUCTION	4
1 Introduction	13
1.1 Scope	13
1.2 Background.....	13
1.3 Reference Documents	13
1.4 Definitions of Terms	14
1.4.1 Accessory Charger Adaptor	14
1.4.2 ACA-Dock	14
1.4.3 Attach versus Connect	14
1.4.4 Charging Downstream Port	14
1.4.5 Charging Port	14
1.4.6 Dead Battery Threshold	14
1.4.7 Dedicated Charging Port	15
1.4.8 Downstream Port	15
1.4.9 Micro ACA	15
1.4.10 Portable Device	15
1.4.11 Rated Current	15
1.4.12 Standard ACA	15
1.4.13 Standard Downstream Port	15
1.4.14 USB Charger	15
1.4.15 Weak Battery Threshold	15
1.5 Parameter Values	16
1.6 OTG Considerations	16
1.7 Super Speed Considerations	16
2 Dead Battery Provision	16
2.1 Background.....	16
2.2 DBP – Unconfigured Clause	16
2.3 DBP – Configured Clause	17
3 Charging Port Detection	18
3.1 Overview.....	18
3.2 Charger Detection Hardware	19
3.2.1 Overview	19
3.2.2 VBUS Detect	20
3.2.3 Data Contact Detect	20
3.2.4 Primary Detection	23
3.2.5 Secondary Detection	30
3.2.6 ACA Detection	32
3.3 Charger Detection Algorithms	34
3.3.1 Weak Battery Algorithm	34
3.3.2 Good Battery Algorithm	35
3.4 Charger Detection Timing	36
3.4.1 Data Contact Detect Timing	36
3.4.2 Detection Timing, CDP	38
3.5 Ground Current and Noise Margins	40
4 Charging Port and Portable Device Requirements	40

4.1	Charging Port Requirements	40
4.1.1	Overshoot	40
4.1.2	Maximum Current	40
4.1.3	Detection Renegotiation	40
4.1.4	Shutdown Operation	41
4.1.5	Failure Voltage	41
4.1.6	Multiple Ports	41
4.2	Charging Downstream Port	41
4.2.1	Required Operating Range	41
4.2.2	Shutdown Operation	42
4.2.3	Undershoot	42
4.2.4	Detection Signaling	42
4.2.5	Connector	43
4.3	ACA-Dock	43
4.3.1	Required Operating Range	43
4.3.2	Undershoot	43
4.3.3	Detection Signaling	43
4.3.4	Connector	43
4.4	Dedicated Charging Port	43
4.4.1	Required Operating Range	43
4.4.2	Undershoot	44
4.4.3	Detection Signaling	44
4.4.4	Connector	44
4.5	Accessory Charger Adapter	45
4.5.1	Required Operating Range	45
4.5.2	Undershoot	45
4.5.3	Detection Signaling	45
4.5.4	Connector	45
4.6	Portable Device	45
4.6.1	Allowed Operating Range	45
4.6.2	Detection Signaling	46
4.6.3	Detection Renegotiation	46
4.6.4	Connector	47
5	Parameter Values	47
6	Accessory Charger Adapter	50
6.1	Introduction	50
6.2	Micro ACA	52
6.2.1	Micro ACA Ports	52
6.2.2	Micro ACA Connectivity Options	53
6.2.3	Micro ACA Architecture.....	53
6.2.4	Micro ACA Modes of Operation	54
6.2.5	Implications of not Supporting Micro ACA Detection	56
6.2.6	Micro ACA Requirements	56
6.2.7	Portable Device State Diagram	57
6.3	Standard ACA	59
6.3.1	Standard ACA Ports	59
6.3.2	Standard ACA Architecture	60
6.3.3	Standard ACA Modes of Operation	62
6.3.4	Implications of not Supporting Standard ACA Detection	62

6.3.5	Standard ACA Requirements	62
	Figure 3-1 – System Overview	18
	Figure 3-2 – Charger Detection Hardware	19
	Figure 3-3 – Data Pin Offset	20
	Figure 3-4 – Data Contact Detect, Not Attached	21
	Figure 3-5 – Data Contact Detect, Standard Downstream Port	22
	Figure 3-6 – Primary Detection, DCP	23
	Figure 3-7 – Primary Detection, CDP	25
	Figure 3-8 – Primary Detection, SDP	26
	Figure 3-9 – Primary Detection, ACA-Dock	27
	Figure 3-10 – Primary Detection, ACA	29
	Figure 3-11 – Secondary Detection, DCP	30
	Figure 3-12 – Secondary Detection, CDP	31
	Figure 3-13 – ACA Detection	33
	Figure 3-14 – Weak Battery Algorithm	34
	Figure 3-15 – Good Battery Algorithm	35
	Figure 3-16 – DCD Timing, Contact After Start	37
	Figure 3-17 – DCD Timing, Contact Before Start	37
	Figure 3-18 – DCD Timing, No Contact	38
	Figure 3-19 – Detection Timing, CDP	39
	Figure 4-1 – CDP Required Operating Range	42
	Figure 4-2 – DCP Required Operating Range	44
	Figure 4-3 – Portable Device Allowed Operating Range	46
	Figure 6-1 – Accessory Charger Adapter	51
	Figure 6-2 – Micro ACA Ports	52
	Figure 6-3 – Micro ACA Architecture	54
	Figure 6-4 – Portable Device State Diagram	58
	Figure 6-5 – Standard ACA Ports	59
	Figure 6-6 – Standard ACA Architecture	61
	Table 5-1 – Voltages	47
	Table 5-2 – Currents	48
	Table 5-3 – Resistances	49
	Table 5-4 – Capacitances	49
	Table 5-5 – Times	50
	Table 6-1 – Micro ACA Connectivity Options	53
	Table 6-2 – Micro ACA Modes of Operation	55
	Table 6-3 – Standard ACA Connectivity Options	60
	Table 6-4 – Standard ACA Modes of Operation	62

**Battery Charging
Specification
(Including errata and ECNs through March 15, 2012)**

**Revision 1.2
March 15, 2012**

**Copyright © 2012, USB Implementers Forum, Inc.
All rights reserved.**

A LICENSE IS HEREBY GRANTED TO REPRODUCE THIS SPECIFICATION FOR INTERNAL USE ONLY. NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, IS GRANTED OR INTENDED HEREBY.

USB-IF AND THE AUTHORS OF THIS SPECIFICATION EXPRESSLY DISCLAIM ALL LIABILITY FOR INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS, RELATING TO IMPLEMENTATION OF INFORMATION IN THIS SPECIFICATION. USB-IF AND THE AUTHORS OF THIS SPECIFICATION ALSO DO NOT WARRANT OR REPRESENT THAT SUCH IMPLEMENTATION(S) WILL NOT INFRINGE THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS.

THIS SPECIFICATION IS PROVIDED "AS IS" AND WITH NO WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE. ALL WARRANTIES ARE EXPRESSLY DISCLAIMED. NO WARRANTY OF MERCHANTABILITY, NO WARRANTY OF NON-INFRINGEMENT, NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, AND NO WARRANTY ARISING OUT OF ANY PROPOSAL, SPECIFICATION, OR SAMPLE.

IN NO EVENT WILL USB-IF OR USB-IF MEMBERS BE LIABLE TO ANOTHER FOR THE COST OF PROCURING SUBSTITUTE GOODS OR SERVICES, LOST PROFITS, LOSS OF USE, LOSS OF DATA OR ANY INCIDENTAL, CONSEQUENTIAL, INDIRECT, OR SPECIAL DAMAGES, WHETHER UNDER CONTRACT, TORT, WARRANTY, OR OTHERWISE, ARISING IN ANY WAY OUT OF THE USE OF THIS SPECIFICATION, WHETHER OR NOT SUCH PARTY HAD ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Contributors

Mark Lai	Allion Test Labs
Sammy Mbanta	Astec Power
Abel Astley	Broadcom
Kenneth Ma	Broadcom
Shimon Elkayam	Broadcom
Gaurav Singh	Cypress
Dan Ellis	DisplayLink
Graham Connolly	Fairchild
Oscar Freitas	Fairchild
Joel Silverman	Kawasaki
Pat Crowe	MQP Electronics
Juha Heikkila	Nokia
Richard Petrie	Nokia
Sten Carlsen	Nokia
Jeroen Kleinpenning	NXP Semiconductors
Terry Remple, Chair	Qualcomm
Dave Haglan	SMSC
Mark Bohm	SMSC
Morgan Monks	SMSC
Tim Knowlton	SMSC
Morten Christiansen	ST Ericsson
Nicolas Florenchie	ST Ericsson
Shaun Reemeyer	ST Ericsson
George Paparrizos	Summit Microelectronics
Adam Burns	Synopsys
Wei Ming	Telecommunication Metrology Center of MII
Jean Picard	Texas Instruments
Ivo Huber	Texas Instruments
Pasi Palojarvi	Texas Instruments
Steven Tom	Texas Instruments
Ed Beeman	USB-IF
Mark Paxson	USB-IF

Revision History

Revision	Date	Author	Description
BC1.0	Mar 8, 2007	Terry Remple	First release
BC1.1	April 15, 2009	Terry Remple	Major updates to all sections. Added Data Contact Detect protocol, and Accessory Charger Adapter.
BC1.2	Oct 5, 2010	Terry Remple Adam Burns	<p>Following items indicate changes from BC1.1 to BC1.2. References below to Section, Figures and Tables refer to BC1.2, unless BC1.1 is specifically indicated.</p> <ol style="list-style-type: none"> 1. Allow DCPs to output more than 1.5A. Allows Portable Devices (PDs) with switch mode chargers to draw more power. Section 4.4.1. 2. Increase minimum CDP current to 1.5A. Without change, PDs had to draw less than 500mA, to avoid CDP shutdown. Table 5-2. 3. Indicate that ICDP max and IDCP max limits of 5A come from USB 2.0, and are safety limits. Table 5-2 note 1. 4. Allow PDs to draw up to 1.5A during HS chirp and traffic. Remove previous limits of 560mA and 900mA which was based on HS common mode ranges. Section 3.5. 5. Require CDPs to support 1.5A during HS chirp and traffic. Affects CDP common mode range. Section 3.5. 6. Reduce maximum PD current from 1.8A to 1.5A, to avoid shutdown when attached to CDP. Table 5-2. 7. Rename Docking Station to ACA-Dock, to avoid confusion with other types of Docking Stations. 8. Require ACA-Dock to differentiate itself from an ACA, by enabling VDM_SRC during no activity. Section 3.2.4.4. 9. Allow CDP to leave VDM_SRC enabled while peripheral not connected. Section 3.2.4.2. 10. Remove ICHG_SHTDWN. This was a recommended max output current for Charging Ports with VBUS grounded. BC1.1 Section 4.1. 11. Require VDP_SRC to not pull D+ below 2.2V when D+ is being pulled to VDP_UP through RDP_UP. Require VDM_SRC to not pull D- below 2.2V when D- is being pulled high. Required for ACA-Dock support. Table 5-1 notes 1 and 2. 12. Make DCD current source optional for PDs. Section 3.2.3. 13. Make DCD timeout required for PDs. Section 3.2.3. 14. Make Secondary Detection optional for PDs. Section 4.6.2. 15. Make Good Battery Algorithm required behavior for PDs. Section 3.2.4. 16. Remove resistive detection. BC1.1 Section 3.9. 17. Change PD Required Operating Range to include 4.5V at 500mA. Figure 4-3. 18. Allow any downstream port to act as a DCP. Section 4.1.3. 19. Require PDs to enable VDP_SRC or RDP_PU when charging from a DCP. Section 3.3.2.

Revision	Date	Author	Description
			20. Allow chargers to renegotiate current with PD by dropping and reasserting VBUS. Section 4.1.3. 21. Require PDs to discharge their own VBUS input after VBUS drops to support charger port renegotiation request. Section 4.6.3. 22. Allow PDs to disconnect and repeat Charger Detection multiple times while attached, with specified timing. Section 4.6.3. 23. Reduce DCP input impedance between D+, D- to VBUS and ground from 1MΩ to 300kΩ. Section 4.4.3. 24. Require CDPs to recover after over-current condition. Section 4.2.2. 25. Allow greater DCP undershoot for large load current steps, to enable low quiescent current chargers required by Europe. Section 4.4.2. 26. Define ACAs and ACA-Docks as types of Charging Ports. Section 1.4.5. 27. Use session valid voltage range defined in EH and OTG Supplement rev 2.0. Section 3.2.2. 28. Only devices that can operate stand-alone from internal battery power are allowed to use the Dead Battery Provision. Section 2.2. 29. Allow compound PDs to draw ISUSP plus an responsible for protecting themselves against higher voltages on VBUS. BC1.1 Section 6.7. 45. Require ACAs to continue providing power to OTG device from Charging Port, even if ground offsets or USB reset cause D- to go below VDAT_REF. Section 6.2.6. 46. Change charger shutdown recovery time (TSHTDWN_REC) from 2 seconds to 2 minutes. Table 5-5. 47. Indicate that ACA-Dock is required to pull D+ to VDP_UP with RDP_UP when VBUS is asserted. Section 3.2.4.4. 48. Remove statements regarding devices with multiple receptacles. Covered in Multiple Receptacle white paper at http://www.usb.org/developers/docs/ . 49. Improve readability by adding and updating drawings, re-structuring sections, and clarifying text.
BC 1.2 plus errata	Oct 12, 2011	Pat Crowe	Includes errata changes from Oct 12, 2011
BC 1.2 plus further errata	Mar 15, 2012	Pat Crowe	Includes errata changes from Mar 15, 2012: 1. Corrections to Micro ACA specification.

Acronyms

ACA	Accessory Charger Adapter
CDP	Charging Downstream Port
DBP	Dead Battery Provision
DCD	Data Contact Detect
DCP	Dedicated Charging Port
FS	Full Speed
HS	High-Speed
LS	Low-Speed
OTG	On-The-Go
PC	Personal Computer
PD	Portable Device
PHY	Physical Layer Interface for High-Speed USB
PS2	Personal System 2
SDP	Standard Downstream Port
SRP	Session Request Protocol
TPL	Targeted Peripheral List
USB	Universal Serial Bus
USBCV	USB Command Verifier
USB-IF	USB Implementers Forum
VBUS	Voltage line of the USB interface

UNIVERSAL SERIAL BUS INTERFACES FOR DATA AND POWER –

Part 1-1: Common components – USB Battery Charging Specification, Revision 1.2

1 Introduction

1.1 Scope

The Battery Charging Working Group is chartered with creating specifications that define limits as well as detection, control and reporting mechanisms to permit devices to draw current in excess of the USB 2.0 specification for charging and/or powering up from dedicated chargers, hosts, hubs and charging downstream ports. These mechanisms are backward compatible with USB 2.0 compliant hosts and peripherals.

1.2 Background

The USB ports on personal computers are convenient places for Portable Devices (PDs) to draw current for charging their batteries. This convenience has led to the creation of USB Chargers that simply expose a USB standard -A receptacle. This allows PDs to use the same USB cable to charge from either a PC or from a USB Charger.

If a PD is attached to a USB host or hub, then the USB 2.0 specification requires that after connecting, a PD must draw less than:

- 2.5 mA average if the bus is suspended
- 100 mA if bus is not suspended and not configured
- 500 mA if bus is not suspended and configured for 500 mA

If a PD is attached to a Charging Port, (i.e. CDP, DCP, ACA-Dock or ACA), then it is allowed to draw [IDEV_CHG](#) without having to be configured or follow the rules of suspend.

In order for a PD to determine how much current it is allowed to draw from an upstream USB to be port, there need mechanisms that allow the PD to distinguish between a Standard and a Charging Downstream Port Port. This specification defines just such mechanisms.

Since PDs can be attached to USB chargers from various manufacturers, it is important that all provide an acceptable user experience. This specification defines the requirements for a compliant USB charger, which is referred to in this spec as a USB Charger.

If a PD has a Dead or Weak Battery, then the Connect Timing Engineering Change Notice (ECN) issued by the USB-IF on the USB 2.0 spec allows that device to draw up to 1 UNIT while attached but not connected. The conditions associated with this ECN are contained in [Section 2](#) of this specification, and are referred to as the Dead Battery Provision (DBP).

1.3 Reference Documents

The following specifications contain information relevant to the Battery Charging Specification.

- OTG and Embedded Host Supplement, Revision 2.0
- USB 2.0 Specification
- USB 3.0 Specification